Murexiella perculta, sp. nov. (Gastropoda:Muricidae), from the Miocene of Victoria

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ABSTRACT

Murexiella perculta, sp. nov., from the middle Miocene of Victoria, is the first recorded occurrence of the genus *Murexiella* s.s. in the fossil record of Australia. Comparison is made with the Pliocene-Recent group of *Murexiella (Subpterynotus)* and it is concluded that this new species is not in the line of the latter group, but is most nearly related to the ancestral *Murexiella* s.s. species, such as *M. steuri* (Cossmann), from the middle Eocene of France.

INTRODUCTION

Some time ago the writer (Vokes, 1974) published a paper on the subject of Recent species of Australia that seemed to be most nearly related to fossil forms found in the Tertiary of the Western Atlantic. This paper was written with the full knowledge that in time intermediate species would be discovered that would prove there was no validity to what she was suggesting but little did she anticipate that she would be the one to discover them. However, an extended visit to Australia during the last half of 1980 permitted both a study of collections at the Australian Museum and an all too brief collecting trip to classic Tertiary localities, such as Fossil Beach and Muddy Creek, in Victoria. The result of these activities was recognition of a number of new fossil muricids, some of which are being described in an accompanying article and another that is described herein.

The muricid genus *Murexiella* is one of the first genera to be developed in that family, being known from beds as old as middle Eocene in both the United States and France. In the Recent fauna there are numerous species known from all parts of the tropical world, including Australia (see Ponder, 1972).

In the typical *Murexiella* (type species: *Murex hidalgoi* Crosse, 1869; Recent, Caribbean) the varices (which number from four to seven) are ornamented by more or less long fingerlike processes, connected by elaborately laminated webbing. The siphonal canal is moderately short and is ornamented only by the elongate processes, sans webbing. In the subgenus *Subpterynotus* (type species: *Murex textilis* Gabb, 1873; Miocene, Dominican Rep.) the varices may be reduced to three in number in the adult; the digitations are reduced in relative size and are webbed to the tips; the webbing continues down the length of the siphonal canal. Thus, the Australian species

Murex tatei Verco, 1895, in the Recent fauna, and *Homalocantha antecedens* Ludbrook, 1958, from the Pliocene, have both been referred to *Murexiella (Subpterynotus).* (See Vokes, 1974, for further discussion and illustrations of the pertinent species.) However, the Australian species differ from the typical *Subpterynotus* in ways that indicate they are closer to the ancestral *Murexiella* morphotype. The siphonal canal is not so elongated and there are more than three varices on the adult body whorl. This suggests that the resemblance of the Pliocene and Recent Australian species to the American *Subpterynotus textilis* may only be due to convergence.

The problems of convergence in the Muricidae is one that is a continual complication. Repeatedly we see totally different lines gradually evolving to amazingly similar end products. The most notable example is in the *Pterynotus-Pteropurpura* groups, which (although in different subfamilies) have a shell morphology that confused workers for years until the differences in the radula, operculum, and even shell composition (aragonite *vs.* calcite) were recognised. There is now good evidence (D'Attilio, 1982) that the various genera united into the subfamily Typhinae, due to the presence of the "characteristic" tubes, may be only distantly related and the entire "group" may be a massive case of convergence. The similarity of the spinose shells of *Murex* s.s. and some members of the subgenus *Chicoreus (Siratus)* are certainly, once again, only due to convergence.

So the possibility that the Australian and American members of *Subpterynotus* are not closely related is real. But the very finely laminated ornamentation in the Australian and American species referred to *Subpterynotus* is amazingly similar and unlike the typical *Murexiella.* Both have an elongated canal, with the webbing continuing down the full length of this canal (if anything, more well-developed in the Australian species than in the American one). In contrast, the newly-found Miocene Australian species *M. perculta* is more akin to the typical *Murexiella* species, especially such Eocene forms as *"Murex" stueri* Cossmann, 1889 (see p1. 1, fig. 7), than to the *Subpterynotus* morphotype. There is no compelling evidence other than geography to indicate that the Miocene species is, in fact, ancestral to the younger ones.

Superficially *M. perculta* bears the strongest resemblance to members of the genus *Homalocantha,* especially the living Australian *H. secunda* (Lamarck, 1822). But there is one marked difference between all members of *Homalocantha* and this new species and that is the presence of a large partition, or varical flange, above the aperture, crossing the suture at each varix. It is this shell character that permits us to distinguish between the otherwise remarkably similar shells of two genus-groups, which are extremely different in both radular and opercular characters.

Homalocantha Mörch, 1852 (type species: *Murex scorpio* Linné, by monotypy), is certainly derived from the older *Murexiella;* however, it may be distinguished by the presence of a purpuroid operculum (with a lateral nucleus) and a muricoid radula, in contrast to the three-dimensional muricopsine radula of *Murexiella.* The earliest known species of *Homalocantha* is apparently *"Murex" pauli* Tournouer *in* Benoist, 1880, which Cossmann and Peyrot (1923, p. 126, pl. 13, figs. 40,41) state occurs in the Burdigalian and possibly in the Aquitanian (based upon a single juvenile example) of France. In the Aquitanian of the United States there is another species very like *H. pauli* but even more similar to the Australian *M. perculta.* The American *"Murex" crispangula* Heilprin, 1887 (here figured, pl. 1, fig. 6) differs from the European *"M." pauli* in that the latter has four major spiral cords separated by sets of alternating secondary and tertiary threads but the American species has six such major cords, with the result that all of the ornamentation is reduced in size, even though the three orders of magnitude are still present.

The six major spiral cords create a strong air of resemblance between the American and the Australian shells but there is no trace of a partition in *M. perculta.* Once again we must invoke convergence in the two lines: one, the American *"M." crispangula,* which may be the first *Homalocantha;* and another, the Australian *M. perculta,* which only superficially looks like *Homalocantha.*

In most species of Muricidae there are three orders of spiral ornamentation: primary major spiral cords separated by alternating secondary and tertiary threads, in a pattern of primary, tertiary, secondary, tertiary, primary. This pattern *appears* to be reduced in *M. perculta* and, looking directly at the shell, it seems to have only primary and secondary ornament. But the tertiary threads are present on the vertical sides of the extended major cords and can be seen only by tilting the shell. This same type of "hidden" thread also occurs in *M. stueri,* which may indicate a close relationship.

Thus, the finding of the first fossil example of *Murexiella* s.s. in the Australian Tertiary, has raised more questions than it has answered. It has not shed any light on the ancestry of the *Subpterynotus* group or the problem of the disjunct distribution of the species presently referred to that group. Presumably both lines descended from an Eocene Tethyan ancestor but the intermediate stage in both lines remains as much of a mystery as it was ten years ago. The Eocene *"Murex" stueri* Cossmann seems the most likely ancestor for the Miocene Australian form. But for the Miocene *M. perculta* to evolve into the Pliocene *Subpterynotus antecedens* still requires considerable changes in morphology.

The development of the American side of the group is even less certain. There is not any Eocene species yet known that has any resemblance more than any other. The only species with which it can be associated are the European Aquitanian and Burdigalian *"Murex" subgranifer* Cossmann and Peyrot, 1923, which is virtually identical to the living *"Murex" exquisitus* Sowerby, 1904 (of unknown provenance), and the Helvetian and Tortonian *"Murex" graniferus* Michelotti, 1841. The Aquitanian *"M." subgranifer* is certainly the ancestor of *Subpterynotus textilis* in the New World and *S. granifera* in the Old (it is very likely that these two latter species are synonymous) but, as yet, we have no candidate for any forerunner to *S. subgranifer.*

SYSTEMATIC DESCRIPTION

Family MURICIDAE da Costa, 1776
Subfamily MURICOPSINAE Radwin and D'Attilio, 1971
Genus MUREXIELLA Clench and Pérez Farfante, 1945

Murexiella CLENCH and PÉREZ FARFANTE, 1945: 49.

Type species: *Murex hidalgoi* Crosse, 1869, by original designation.

Minnimurex WOOLACOTT, 1957:115.
Type species: *Minnimurex phantom* Woolacott, 1957, by original designation.

MUREXIELLA PERCULTA E.H. Vokes, sp. nov.
Plate 1, figs. 1-5

Description: Shell large for the group, spire low, body whorl inflated; five teleoconch whorls and a large, smooth, bulbous protoconch (number of whorls uncertain, invariably broken and plugged). Ornamentation initiated abruptly at a small varix; spiral ornamentation beginning with a single cord at periphery but by end of first post-nuclear whorl with three strong cords, these appearing on later whorls as high flat-topped flanges circling the shell; gradually smaller threads intercalated, two between the suture and shoulder cord and one between each pair of stronger cords; weak tertiary threads developed on the vertical, flattened sides of the major spiral cords, these numbering seven on the body whorl, plus an additional four or five on the siphonal canal, the latter also with secondary and tertiary threads intercalated; adult shell covered by alternating primary and secondary cords, tertiary threads not visible unless shell is tilted. Axial ornamentation on first post-nuclear whorl of about 12 laminae, lapping onto the smooth protoconch; strenthening into varices and reduced in number to about eight on the second post-nuclear whorl and ultimately to six or seven on the body whorl of the adult. Entire surface of shell covered with thin, axial growth lamellae, these becoming bunched together on both the ad- and abapertural faces of the varices; apertural face of varices covered by shingled laminae, looped over the spiral cords, giving the face an intricate filagree pattern; where spiral cords cross varices a series of square-bottomed grooves formed on adapertural side, crossed by the growth lamellae to form a row of square pits; terminal ends of the spiral cords strongly recurved but not extending past the lamellae. Aperture almost circular; columellar lip narrow, smooth; margin of outer lip crenulated into each of the spiral cords. Siphonal canal moderately long, slightly less than one-half total height of shell, wide, open by a narrow slit; distal end slightly recurved, terminations of previous canals forming a small umbilicus.

Holotype: National Museum of Victoria P 74075; height 34.4 mm, diameter 23.5 mm (Plate 1, fig. 1).

Paratype A: NMV P 74076; height 21.8 mm, diameter 16.1 mm (Plate 1, fig. 3).

Paratype B: NMV P 74077; height 23.5 mm, diameter 15.8 mm (Plate 1, fig. 4).

Paratype C: Australian Museum C.125233; height 24.0 mm, diameter 15.7 mm (Plate 1, fig. 2).

Paratype D: U.S. National Museum 375462; height 15.0 mm, diameter 10.4 mm (Plate 1, fig. 5).

Type locality: Fishing Point Marl, lower mollusk horizon (Longfordian), cliff 30 m above Lake Craven, Aire River. 0.5 km northwest of Red Hill, Horden Vale, Victoria.

Geological distribution of material studied:

BALCOMBIAN

Muddy Creek Marl:
USNM 375462 (paratype D), TU 1384, Muddy Creek, 8 kms west of Hamilton, Vic. (Coll. E.H. Vokes)
Fyansford Formation (=Balcombe Clay): Australian Mus. C.125233 (paratype C), Fossil Beach, Balcombe Bay, about 3 kms south of Mornington, Vic. (Coll. J. Kerslake and T.R. Garrard).

BATESFORDIAN

Fishing Point Marl, upper mollusk horizon.

NMV P 74084, top of cliff at Fischer's Point, 17m above Lake Craven, Aire River, Horden Vale, Vic.

LONGFORDIAN

Fishing Point Marl, lower mollusk horizon.

NMV P 74075 (Holotype) and P 74077 (paratype B), cliff 30 m above Lake Craven, Aire River, 0.5 km northwest of Red Hill, Horden Vale, Vic.
NMV P 74076 (paratype A), low cliff and dam, southeast of Fischer's Point, Lake Craven, Aire River, Horden Vale, Vic.
NMV P 74079 and 74080, cliff southeast of Fischer's Point, 10 m above Lake Craven, Aire River, Horden Vale, Vic.
(All NMV material coll. T.A. Darragh *et al.*)

Discussion: This elegant new species is based upon eight specimens, ranging in age from Longfordian to Balcombian (early to middle Miocene). Although obviously referable to the genus *Murexiella*, there is no other species with which it might be compared. As noted above, superficially it most nearly resembles the members of the genus *Homalocantha* but lacks the varical extension, or partition, above the aperture. It differs from the members of *Subpterynotus* in having much coarser ornamentation and in not having the varical flange as well developed, especially on the siphonal canal.

Most of the living species of *Murexiella* s.s. have about five major spiral cords on the body whorl. The Eocene species such as *M. stueri* and the American *M. mantelli* (Conrad, 1834) (see Vokes, 1968, pl. 5, fig. 1) have seven major cords, as does *M. perculta*, indicating that there has been a trend toward reduction in the modern species of *Murexiella*. In the American *S. textilis* there are still seven but in *S. tatei* there appear to be ten. However, of these, seven are slightly larger, suggesting that the other three arose as secondary threads, which ultimately became almost as large as the primaries. In the juvenile specimen of *M. perculta* (pl.1, fig. 5) this tendency can be seen, in that there are ten primary cords, all of almost equal strength. Can the development of the Australian members of *Subpterynotus* represent neoteny? Certainly there is a much greater degree of similarity between the juvenile example of *M. perculta* and *S. tatei* than there is with the adult specimens.

The name *perculta* (Latin- highly adorned) is in reference to the elaborate development of axial lamellae, which gives to this new species its strongest affinities with the subgenus *Subpterynotus.* Verco (1895, p. 84), in his original description of *"M" tatei,* made the observation that the surface of the shell had "an appearance of being covered with coral, or chain-stitch crochet work which is continuous over the varices." Although of a coarser design, the surface of *M. perculta* likewise has this dramatic decoration, especially on the varical faces.

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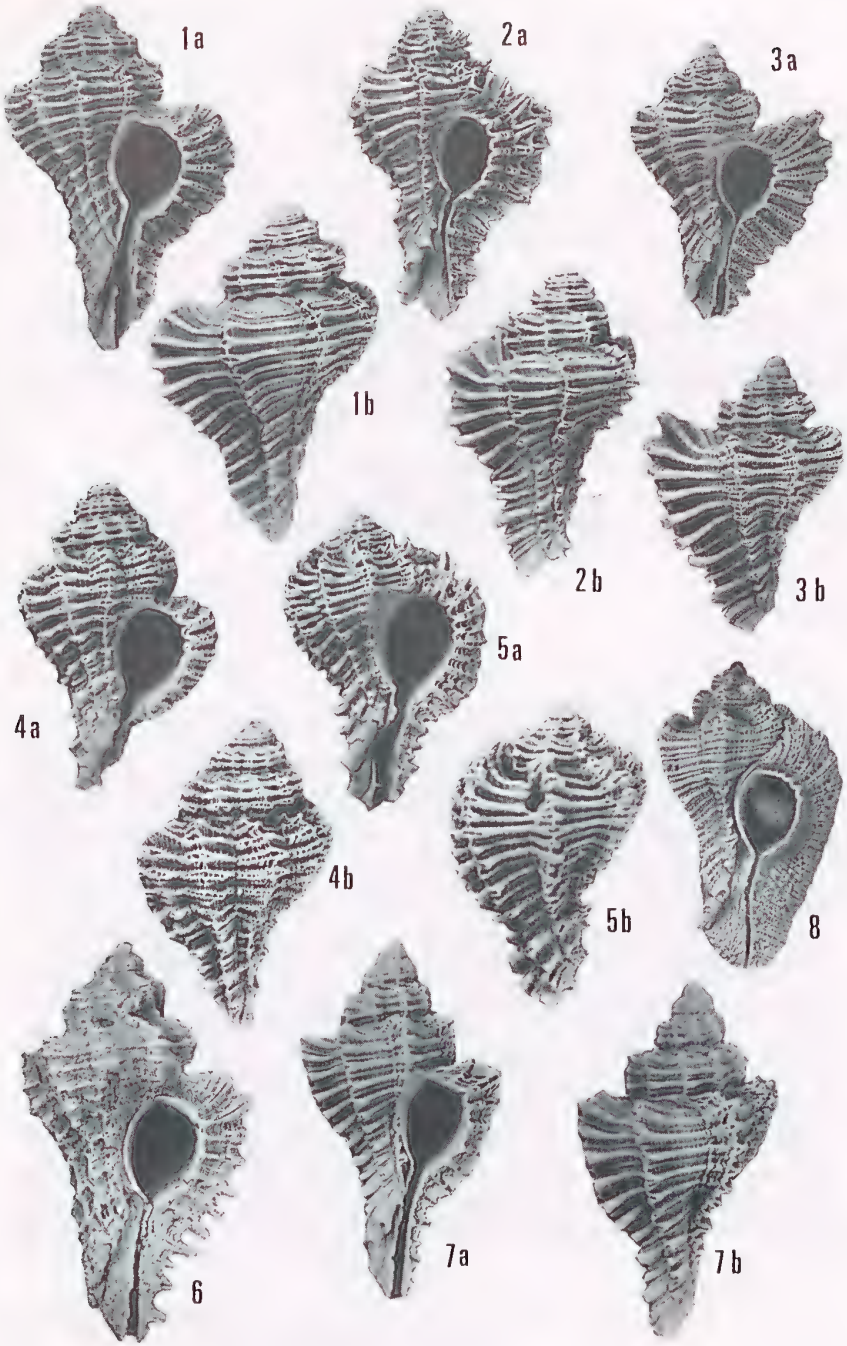
PLATE 1

Figs.

1 - 5. *Murexiella perculta* E.H. Vokes, sp. nov.
   1. (X 1½) NMV P 74075 (holotype); height 34.4 mm, diameter 23.5 mm
      Locality: Lake Craven, Horden Vale, Victoria.
   2. (X 2) Australian Museum C. 125233 (paratype C); height 24.0 mm, diameter 15.7 mm
      Locality: Fossil Beach, Balcombe Bay, Victoria.
   3. (X 2) NMV P 74076 (paratype A); height 21.8 mm, diameter 16.1 mm
      Locality: Lake Craven, Horden Vale, Victoria.
   4. (X 2) NMV P 74077 (paratype B); height 23.5 mm, diameter 15.8 mm
      Locality: Lake Craven, Horden Vale, Victoria.
   5. (X 3) USNM 375462 (paratype D); height 15.0 mm, diameter 10.4 mm
      Locality: TU 1384, Muddy Creek, Hamilton, Victoria.
6. *Murexiella crispangula* (Heilprin, 1887)
   (X 1½) USNM 214442; height 42 mm, diameter 25 mm
   Locality: Ballast Point, Tampa Bay, Florida, USA
7. *Murexiella stueri* (Cossmann, 1889)
   (X 4) Nat. Hist. Mus. Basel H 17137; height 14.9 mm, diameter 8.5 mm
   Locality: Chaussy, near Paris, France
8. *Murexiella (Subpterynotus)* tatei (Verco, 1895)
   (X 2) Wright Coll; height 24.4 mm, diameter 14.3 mm
   Locality: Smoky Bay, South Australia, 36 m ("20 fathoms")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